

7.1 Integral as Net Change

The definite integral of a rate of change gives the net change.

displacement

position

total distance

Dec 13-9:41 PM

The velocity of a particle moving along the x-axis is given by:

$$v(t) = t^2 - \frac{8}{(t+1)^2}$$

- a) Describe the motion
- b) The initial position of the particle is $s(0)=9$, what is the particle's position at $t=1$? at $t=5$?
- c) Find the total distance traveled from $t=0$ to $t=5$.

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Integral of a rate of change gives the total accumulation.

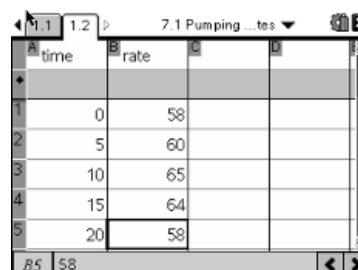
Potato Consumption - From 1970 to 1980 the rate of potato consumption was

$$C(t) = 2.2 + 1.1t$$

millions of bushels per year, with t being years since the beginning of 1970. How many bushels were consumed from the beginning of 1972 to the end of 1973?

Dec 13-9:59 PM

A pump connected to a generator operates at a varying rate shown in the table. How many gallons were pumped during the hour?



The screenshot shows a spreadsheet window titled "7.1 Pumping ...tes". It contains a table with two columns: "time" and "rate". The data is as follows:

	time	rate
1	0	58
2	5	60
3	10	65
4	15	64
5	20	58

At the bottom of the spreadsheet, the formula bar shows "B5 58".

Dec 13-10:10 PM

Work done by a constant force: $W = F \cdot d$

Work done by a variable force: $W = \int_a^b F(x) dx$

It takes a force of 10N to stretch a spring 2m beyond its natural length.
How much work is done in stretching the spring 4m from its natural length?

Dec 13-10:20 PM